What is claimed is:

1. A method for rapid and adaptive processing of oxides of manganese, comprising the steps of:

a. providing a manganese containing solution selected from the group consisting of a slurry of virgin oxides of manganese, a regeneration slurry containing rinsed reacted oxides of manganese, a slurry of loaded oxides of manganese containing disassociated manganese cations, a manganese salt solution containing disassociated manganese cations;

b. providing a aqueous oxidizing solution, the oxidizing solution being prepared to have Eh and pH values within a permanganate stability area or an MnO_2 stability area or to move solution conditions initially into the permanganate stability area or an MnO_2 stability area when contacted with the manganese containing solution;

c. feeding the manganese containing solution and the aqueous oxidizing solution into at least one continuous flow reactor, the solutions being fed either separately into the continuous flow reactor where they mix to form a combined mixed processing solution or being premixed and fed as a combined mixed processing solution;

d. heating the combined mixed processing solution to process temperature;

e. monitoring and adjusting combined mixed processing solution temperature, Eh value, pH value, molarity, and pressure within the continuous flow reactor so as to rapidly and adaptively move combined mixed processing solution conditions into and maintain processing solution conditions within the MnO_2 stability area; and

f. maintaining combined mixed processing solution conditions within the MnO_2 stability area as the combined mixed processing solution travels through the continuous flow reactor so as to produce oxides of manganese selected from the group comprising regenerated oxides of manganese, pretreated oxides of manganese, precipitated oxides, and regenerated and precipitated oxides of manganese.

2. A method for rapid and adaptive processing of oxides of manganese, comprising the steps of:

a. providing a heated manganese containing solution selected from the group consisting of a slurry of virgin oxides of manganese, a regeneration slurry containing rinsed reacted oxides of manganese, a slurry of loaded oxides of manganese containing disassociated manganese cations, a manganese salt solution containing disassociated manganese cations;

b. providing a heated aqueous oxidizing solution, the oxidizing solution being prepared to have Eh and pH values within a permanganate stability area or an MnO_2 stability

area or to move solution conditions initially into the permanganate stability area or an MnO_2 stability area when contacted with the manganese containing solution;

c. feeding the manganese containing solution and the aqueous oxidizing solution into at least one continuous flow reactor, the solutions being fed either separately into the continuous flow reactor where they mix to form a combined mixed processing solution or being premixed and fed as a combined mixed processing solution;

d. monitoring and adjusting combined mixed processing solution temperature, Eh value, pH value, molarity, and pressure within the continuous flow reactor so as to rapidly and adaptively move combined mixed processing solution conditions into and maintain processing solution conditions within the MnO_2 stability area; and

e. maintaining combined mixed processing solution conditions within the MnO_2 stability area as the combined mixed processing solution travels through the continuous flow reactor so as to produce oxides of manganese selected from the group comprising regenerated oxides of manganese, pretreated oxides of manganese, precipitated oxides, and regenerated and precipitated oxides of manganese.

3. The method of claim 1 or claim 2, further comprising the step of heating the combined mixed processing solution within the continuous flow reactor to a temperature at or above 100°C.

4. The method of claim 1 or claim 2, further comprising the step of heating the combined mixed processing solution within the continuous flow reactor to a temperature above 100°C after, wherein the manganese containing solution and the aqueous oxidizing solution are heated to a temperature of about 100°C prior to being fed into the continuous flow reactor.

5. The methods of claim 1 or claim 2; further comprising the steps of :

separating the oxides of manganese from the processing solution to provide separated oxides of manganese and a oxidation filtrate, the oxidation filtrate being routed for further processing and handling; and

rinsing and filtering the separated oxides of manganese to provide rinsed oxides of manganese and a rinse filtrate, the rinse filtrate being directed further handling and processing.

6. The methods of claim 1 or claim 2; further comprising the steps of :

separating the oxides of manganese from the processing solution to provide separated oxides of manganese and a oxidation filtrate, the oxidation filtrate being routed for further processing and handling;

rinsing and filtering the separated oxides of manganese to provide rinsed oxides of manganese and a rinse filtrate, the rinse filtrate being directed further handling and processing; and

drying and/or comminuting the rinsed oxides of manganese.

7. The methods of claim 1 or claim 2; further comprising the steps of :

separating the oxides of manganese from the processing solution to provide separated oxides of manganese and a oxidation filtrate, the oxidation filtrate being routed for further processing and handling;

rinsing and filtering the separated oxides of manganese to provide a rinsed oxides of manganese filter cake or and a rinse filtrate, the rinse filtrate being directed further handling and processing; and

directing the filter cake to a filter cake feed for introduction into a reaction chamber of a pollutant removal system.

8. The methods of claim 1 or claim 2; further comprising the steps of :

separating the oxides of manganese from the processing solution to provide separated oxides of manganese and a oxidation filtrate, the oxidation filtrate being routed for further processing and handling;

rinsing and filtering the separated oxides of manganese to provide a rinsed oxides of manganese filter cake or and a rinse filtrate, the rinse filtrate being directed further handling and processing;

adding water to the rinsed oxides of manganese to form a oxides of manganese slurry; and

directing the oxides of manganese slurry to a feeder selected from the group consisting of slurry feeders, spray feeders, spray injection feeders for introduction into a reaction chamber of a pollutant removal system.

9. The method claim 1 or claim 2, wherein the aqueous oxidizing solution contains an oxidant or oxidizer selected from the group consisting of persulfates, chlorates, perchlorates, permanganates, peroxides, hypochlorites, organic oxidizers, oxygen, air, and ozone.

10. A system for rapid and adaptive processing of oxides of manganese, the system comprising:

a continuous flow reactor equipped with an orifice, a back pressure valve, probes for measuring temperature, pressure, Eh and pH values of aqueous solutions within the continuous flow reactor, the continuous flow reactor being configured for introduction of a heated aqueous oxidizing solution and a manganese containing solution a heated manganese containing solution selected from the group consisting of a slurry of virgin oxides of manganese, a regeneration slurry containing rinsed reacted oxides of manganese, a slurry of loaded oxides of manganese containing disassociated manganese cations, a manganese salt solution containing disassociated manganese cations, the manganese containing solution and the aqueous oxidizing solution being processed together in the continuous flow reactor as a combined mixed processing solution;

a manganese vessel equipped with a feeder, the manganese vessel containing the manganese containing solution;

a oxidant vessel equipped with a feeder, the oxidant vessel containing a supply of the aqueous oxidizing solution, the oxidizing solution being prepared to have Eh and pH values within a permanganate stability area or an MnO_2 stability area or to move solution conditions initially into the permanganate stability area or an MnO_2 stability area when contacted with the manganese containing solution;

a plurality of heating units for providing heat to the continuous flow reactor, oxidant vessel, and the manganese vessel;

a base and/or acid feeder for feeding base or acid to the continuous flow reactor;

a least one filtration and/or rinse unit; and

a controller for simultaneously monitoring and adjusting system operational parameters and regulating system components, the controller being in electronic communication with the probes of the oxidant vessel, the manganese vessel, the continuous flow reactor, the feeders, the at least one filtration and/or rinse unit, the back pressure valve and the heating units; the controller being capable of monitoring and adjusting system operational parameters selected from the group consisting of temperature, pressure, molarity, Eh, pH and feeder rates so as adjust and maintain conditions in the continuous flow reactor within the MnO_2 stability area during processing.

11. The system of claim 10, further comprising an electrolytic cell for production of oxidant and other useful by-products, the electrolytic cell being configured to receive and process filtrate and rinse solutions from the at least one filtration/rinse unit, the solutions

being generated from the separation of oxides of manganese processed in the combined mixed processing solution, wherein the controller is in electronic communication with and regulates and controls operation of the electrolytic cell.

12. The system of claim 10, wherein the aqueous oxidizing solution contains an oxidant or oxidizer selected from the group consisting of persulfates, chlorates, perchlorates, permanganates, peroxides, hypochlorites, organic oxidizers, oxygen, air, and ozone.

13. An integrated pollution control and sorbent processing system comprising:

a pollutant removal subsystem for removal of target pollutants from gases, the pollutant removal subsystem comprising:

a feeder containing a supply of sorbent, the feeder being configured to handle and feed sorbent, the sorbent comprising oxides of manganese;

at least one reaction chamber configured to receive sorbent and a gas containing at least one target pollutant, where the gas is introduced at temperatures ranging from ambient temperature to below the thermal decomposition temperature of a reaction product formed by a reaction between the target pollutant and the sorbent and contacted with the sorbent for a time sufficient to effect capture of the target pollutant at a targeted capture rate set point, the target pollutant being captured by reacting with the sorbent to form the reaction product to substantially strip the gas of the target pollutant, the reaction chamber being further configured to render the gas that has been substantially stripped of the target pollutant free of reacted and unreacted sorbent so that the gas may be vented from the reaction chamber; and wherein differential pressure within the system is regulated so that any differential pressure across the system is no greater than a predetermined level;

a pollutant removal controller for simultaneously monitoring and adjusting system operational parameters, the controller providing integrated control of system differential pressure and other operational parameters selected from the group consisting of target pollutant capture rate gas inlet temperature, sorbent feed rate and any combination thereof, wherein differential pressure within the system is regulated so that any differential pressure across the system is no greater than a predetermined level and the target pollutant is removed at their targeted capture rate set points; and

a sorbent processing subsystem for rapid and adaptive processing of oxides of manganese, the sorbent processing subsystem comprising:

a continuous flow reactor equipped with an orifice, a back pressure valve, probes for measuring temperature, pressure, Eh and pH values of aqueous solutions within the continuous flow reactor, the continuous flow reactor being configured for introduction of a heated aqueous oxidizing solution and a manganese containing solution a heated manganese containing solution selected from the group consisting of a slurry of virgin oxides of manganese, a regeneration slurry containing rinsed reacted oxides of manganese, a slurry of loaded oxides of manganese containing disassociated manganese cations, a manganese salt solution containing disassociated manganese cations, the manganese containing solution and the aqueous oxidizing solution being processed together in the continuous flow reactor as a combined mixed processing solution;

a manganese vessel equipped with a feeder, the manganese vessel containing the manganese containing solution;

a oxidant vessel equipped with a feeder, the oxidant vessel containing a supply of the aqueous oxidizing solution, the oxidizing solution being prepared to have Eh and pH values within a permanganate stability area or an MnO_2 stability area or to move solution conditions initially into the permanganate stability area or an MnO_2 stability area when contacted with the manganese containing solution;

a plurality of heating units;

a base and/or acid feeder for feeding base or acid to the continuous flow reactor;

a least one filtration and/or rinse unit; and

a sorbent processing controller for simultaneously monitoring and adjusting system operational parameters and regulating system components, the controller being in electronic communication with the probes of the oxidant vessel, the manganese vessel, the continuous flow reactor, the feeders, the at least one filtration and/or rinse unit, the back pressure valve and the heating units; the controller being capable of monitoring and adjusting system operational parameters selected from the group consisting of temperature, pressure, molarity, Eh, pH and feeder rates so as adjust and maintain conditions in the continuous flow reactor within the MnO_2 stability area during processing.

14. The system of claim 13, wherein the at least one reactions chamber is selected from the group of reaction zones that includes a fluidized bed, a pseudo-fluidized bed, a reaction

column, a fixed bed, a moving bed, a serpentine reactor, a section of pipe or duct, and a cyclone.

15. The system of claim 13, wherein the at least one reactions chamber is bag house.

16. The system of claim 13,wherein the pollutant removal controller and sorbent processing controller are sub-control elements of an integrated system controller.

17. The system of claim 13, further comprising conveyors to direct reacted sorbent from the reaction chamber for processing in the sorbent processing subsystem and to direct process sorbent from the sorbent processing subsystem for introduction into the pollutant removal subsystem.